Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of Parts 2 and 95 of the	)	ET Docket No. 09-36
Commission's Rules to Provide Additional	)	
Spectrum for Medical Device	)	
Radiocommunication Service in the	)	
413–457 MHz Band	)	

To: The Commission

Rebuttal *Ex Parte* Comments of EIBASS

Engineers for the Integrity of Broadcast Auxiliary Services Spectrum (EIBASS) hereby respectfully submits its *ex parte* comments in the above-captioned notice of proposed rulemaking relating to medical micro-power network service (MMNS) devices at 413–457 MHz. These comments are in response to the April 8 and May 3, 2011, Alfred Mann Foundation (AMF) *ex parte* filings.

I. Background Information

1. In its April and May 2011 *ex parte* filings, AMF at long last provides technical details about its methods to avoid having MMNS devices *receive* interference from incumbent stations at 413–419 MHz; 426–432 MHz; 438–444 MHz; and 451–457 MHz. These first three bands are in federal government spectrum, but the fourth band covers non-federal government (private) Land Mobile stations, and, of the most interest to EIBASS, Part 74, Subpart D, Remote Pickup (RPU) stations operating at 455-456 MHz. Such RPU stations would therefore be *co-channel* to MMNS devices operating at 451-457 MHz.

2. For some time EIBASS, and also the Society of Broadcast Engineers, Inc. (SBE), have expressed concern about the secrecy surrounding the AMF W2DXLW experimental license, and the suppression of its six-month status reports. AMF has made sweeping claims about how implanted devices would avoid receiving debilitating interference from co-channel stations, but until now has provided virtually no technical details of its proposed system. EIBASS agrees that MMNS is no interference threat to 455-456 MHz RPU operations, but wants to avoid another "notify health care facilities" fiasco such as occurred during the DTV transition, when DTV stations started operating on formerly vacant TV channels. This caused interference to medical

telemetry operations, which had so imprudently elected to operate as Part 15, unprotected, communication devices, even though used for potentially critical monitoring of patients in coronary care units (CCUs) and other medical applications.

3. Philosopher, essayist poet and novelist George Santayana (1863–1952) wrote "Those who cannot remember the past are condemned to repeat it." EIBASS does not want to see that happen for 455-456 MHz RPU operations, where existing Broadcast Auxiliary Service (BAS) RPU licensees might be forced to first do a survey for operating MMNS devices before deploying for a remote broadcast at or near a health care facility, just as compliance was required of newcomer DTV stations with the "notify health care facilities" condition that was routinely placed on DTV construction permits[1]. EIBASS also believes that it would not be in the public interest to end up forcing first-responder Paramedics or emergency medical technicians (EMTs) riding in an ambulance with a patient, and wanting to use a handie-talkie (HT) radio, to first have to ensure that the patient doesn't have implanted nuero-stimulators that could suffer co-channel interference or brute force overload (BFO) if the HT were to be used in a confined space and in close proximity to the patient. AMF has so far been silent on potential adverse effects of BFO on their implanted devices, or what warnings will have to be given to implant recipients prior to surgery.

II. AMF *Ex Parte* Technical Showings Fail To Address Two Critical Issues

4. Thus, it is surprising to EIBASS, as it should be telling to the Commission, that the technical reports recently filed by AMF failed to address the above points. Had EIBASS/SBE not repeatedly pointed out these threats, EIBASS could perhaps conclude that these scenarios

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[1] That construction permit (CP) condition reads as follows:
The grant of this construction permit is subject to the condition that, with ample time before commencing operation, you make a good faith effort to identify and notify health care facilities (e.g., hospitals, nursing homes, see 47 CFR 15.242(a)(1)) within your service area potentially affected by your DTV operations. Contact with state and/or local hospital associations and local governmental health care licensing authorities may prove helpful in this process. During this pre-broadcast period, you must provide all notified entities with relevant technical details of your operation, such as DTV channel, targeted on-air date, effective radiated power, antenna location, and antenna height. You are required to place in the station's public inspection file documentation of the notifications and contacts made and you may not commence operations until good faith efforts have been made to notify affected health care facilities. During this pre-broadcast period for up to twenty (20) days after commencing operations, should you become aware of any instances of medical devices malfunctioning or that such devices are likely to malfunction due to your DTV operations, you must cooperate with the health care facility so that it is afforded a reasonable opportunity to resolve the interference problem. At such time as all provisions of this condition have been fulfilled, and either upon the expiration of twenty (20) days following commencement of operations or when all known interference problems have been resolved, whichever is later, this condition lapses.

had been inadvertently overlooked. But since both SBE and EIBASS have pointed out these issues, their omission from the AMF filings can only mean that AMF is hoping that the Commission won't notice. This *ex parte* filing is therefore to document, for the docket record, that the omissions have indeed been noticed. and put into the record.

5. EIBASS will first address the April 8, 2011, AMF *ex parte* filing. At page 4, item 7, AMF states:

> If a microstimulator cannot successfully decode seven consecutive transmissions, it assumes communications is lost and must ensure that it does not do something harmful. This default activity prevents the implanted microstimulator from reacting to interfering signals that cannot be successfully decoded and the microstimulator does not resume operation until it successfully resynchronizes communication with the MCU.

EIBASS submits, though, that any patient needing an implanted and radio controlled microstimulator(s) would potentially be put at risk should the system quit functioning. That is, just as there is unlikely to be a fail-gracefully scenario for a patient with an artificial leg that collapses, any patient needing implanted microstimulators will be at risk if those devices unexpectedly stop working.

6. Again at page 4, last paragraph, AMF claims:

> Although the JSC Report[2] did not specifically examine incumbent non-government systems in the 450-460 MHz frequency band, its finding s and conclusions can be extrapolated to establish the EMC of MMN and incumbent non-government systems in the band.

AMF is wrong. Although RPU operations used for dispatching of electronic news gathering (ENG) operations and for traffic reporting are similar to private Land Mobile operations (and probably many federal government operations), RPU stations used for remote broadcasts are not. Land Mobile transmissions tend to be, as the term implies, mobile. They also tend to have intermittent duty cycles. Neither applies to a portable RPU base station, which can be at a fixed location and continuously on the air for several hours (sometimes days) while doing a remote broadcast.

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[2] The Joint Spectrum Center (JSC) is a field office within the Defense Spectrum Organization (DSO) of the Department of Defense (DoD) that has leading experts in the areas of spectrum planning, electromagnetic environmental effects, information systems, modeling and simulation, and operations, to provide spectrum-related services to military departments and combatant commands. While EIBASS does not question JSC's technical abilities, that organization is probably not fully cognizant of how broadcasters use their Broadcast Auxiliary Service's spectrum.

7. At page 5, the AMF letter states:

> First, ITT found that the test results in the Aerospace Test Report adequately demonstrated the effectiveness on MMN interference mitigation techniques.

and that

> ITT recommended no additional tests, unless MMN firmware is modified.

EIBASS must conclude that ITT didn't read the earlier SBE and EIBASS comments. Because the operational characteristics of RPU stations are so different from the Land Mobile model, EIBASS submits that the ITT conclusions are, in a word, wrong.

8. Attached to the April 8 AMF *ex parte* letter was the March 1, 2011, report of ITT Corporation. A page 2, item 3, the ITT report makes reference to

> the required separation distances to preclude potential interference from Government high-powered transmitters into the MMN receivers.

While EIBASS agrees that so long as MMNS is confined to carefully-isolated medical venues that minimum separations from co-channel, interfering stations can probably be maintained, what happens when MMNS leaves such controlled environments, with a patient having a portable MCU? Now all the artificial constraints of minimum separations to co-channel, interfering transmitters go out the window.

9. At page 3, item 10 of the ITT report, there is a six bullet-point list of studied potentially interfering stations. None include the RPU remote scenario or the EMT in a confined space scenario already pointed out by SBE and EIBASS. Of course, if one overlooks, or possibly even intentionally ignores, problematic interference scenarios, the resulting report can be made to look favorable.

III. The May 3, 2011, AMF *Ex Parte* Filing

10. At slide 5 of the May 3, 2011, AMF *ex parte* filing, the bullet points claim "Interference testing completed" and "AMF supplied additional data to supplement test findings." AMF did not contact EIBASS (or, EIBASS suspects, SBE) and invite them to participate in the interference testing, or ask for any input regarding those interference tests. In light of the oh-so-carefully limited testing, EIBASS can now understand why.

11. At slide 6, AMF states "MMN system's interference mitigation may effectively eliminate harmful effects of interfering signals from LMRs and radar incumbents." While EIBASS does not claim medical expertise, common sense leads us to focus on the operative "may." Again based on common sense, EIBASS believes that is far too low of a threshold for devices intended for real world therapeutic applications. EIBASS has to wonder what sort of small-print disclosures will be given to patients receiving radio-controlled implanted stimulators. Will patients be warned that the proposed use is on a secondary, unprotected basis? Will patients understand what that implies, even if warned? Unless the patient happens to be an electrical engineer with experience in radio allocations, that is not likely.

12. Again at slide 11, AMF quotes the JSC Report as stating "...*may effectively eliminate* the potential for harmful interference" (italics in the original) and "MMN systems may operate without interference from incumbent government fixed radiolocation transmitters..." EIBASS submits that "may" is far too feeble of a benchmark. For medical applications like this, the analysis needs to conclude "will," not "may."

13. At slide 13, which discusses the master control unit (MCU) interference mitigating tools (dynamic channel switching, notching, timing/duty cycle, "coding," and forward error correction), it appears that few of these techniques can be implemented in the return signal from the implanted muscle stimulator back to the MCU. While these interference-mitigating techniques are all possible in an external device that can draw on commercial AC power, or at least reasonably-sized battery power, and is big enough to contain microprocessor chips to provide these functions, it would appear that the small size required for implantable devices will make such interference-mitigating techniques impractical for the present state of the art for the necessarily power-limited receivers inside the implanted devices. Thus, virtually all of the interference-avoiding mitigation methods will have to take place in the MCU. Since the AMF filings make it clear that MMNS needs a duplex path, hardening only half of that path would appear to be problematic.

IV. Summary

14. While EIBSS applauds the intended good of implanted MMNS devices, the bottom line is that the proposed 451–457 MHz fourth MMNS channel is not an appropriate allocation because of the existence of 455–456 MHz RPU stations. RPU stations are different from Land Mobile stations. If JSC/NTIA[3] are comfortable with allowing MMNS in federal government bands (*i.e.*, the first three proposed MMNS bands, at 413–419 MHz; 426–432 MHz; and 438–444 MHz), that is certainly their choice. But EIBASS continues to object to the fourth proposed MMNS band of 451–457 MHz, for the reasons stated above. EIBASS is reminded of a principal of medical ethics linked to the physician's Hippocratic Oath, *primum non nocere*, or "First, do no harm."

Respectfully submitted,

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[3] National Telecommunications and Information Administration, in the Department of Commerce, which has jurisdiction over spectrum allocated for federal government/military use (versus the Federal Communications Commission, which has jurisdiction of over non-federal government spectrum, such as the 455-456 MHz RPU band and 451–455 MHz, and 456–457 MHz, Land Mobile frequencies).